

Introduction

This manual contains information on installation and initial setup of the Coal-trol Digital control system. For instruction on operation of the Coal-trol Digital, please refer to the **Coal-trol Digital Model 1 – Operation Manual**.

The Coal-trol Digital is designed for retrofit onto automatic stoker anthracite coal stoves.

Basic installation of the Coal-trol Digital can be done in as little as 20 minutes. However for some situations, additional time and wiring material will be needed to remove and adapt the electrical elements of the stove to the Coal-trol Digital.

Please consider using a qualified, heating technician or electrician to ensure a correct and safe installation. Installation must be in done accordance with the National Electrical Code (NEC) and local regulations.

Table of Contents

	Page Number
Introduction	13
Important Safety Information	14
Tools Required	15
Additional Material that May Be Required	15
Installation Overview	15
Important Information Concerning Feeder Types	15
Mounting the Thermostat	16
Mounting the Power Module	16
Some Power Module Mounting Alternatives	17
Connect Thermostat to Power Module	17
Attaching Power Cord/Power ON/OFF Switch	18
Identifying and Adapting Your Feeder Type	19
Two-Motor Feeder Type	19
Wiring a Two-Motor Feeder	19
Dual-Burner Type	20
Wiring a Dual Burner Type	21
Single-Motor Tri Burner Type	22
Other Single-Motor Types	22
Wiring a Single-Motor Type (Tri Burner)	23
Power Assisted Flue Vent	24–26
Bonnet Limit	27
Test on Initial Power-up	28
Setup Coal-trol Thermostat for a Particular Stove Type	29–34
Power Module Connection Diagram	35



SYRACUSE • NY

Copyright 2004, 2005 Automation Correct LLC. All rights reserved.
Coal-trol Digital™, Pelli-stat™ by Automation Correct LLC
All others trademarks by the respective owners.

Important Safety Information

ATTENTION – Please follow all manufacturers instructions that came with your stove or furnace. The Coal-Trol Digital is designed to complement and enhance the safe operation of your appliance. Specifically, the Coal-Trol Digital control system is designed for appliances tested to ANSI Standard Designation: **E1509–95 , Standard Specification for Room Heaters, Pellet Fuel-Burning Type** and/or **UL1482 Room Heaters, Solid Fuel Type**.

Use of the Coal-trol Digital on appliances not permanently marked with one of the above designations voids all warranties and may be unsafe. Contact us or your stove manufacturer if you are not sure that your stove/furnace is built in compliance with these safety standards.

WARNING – The Coal-trol Digital is capable of regulating a coal fire smaller than required to maintain proper chimney draft. Follow all manufacturers recommendations for minimum draft pressures and temperature. Installation of a carbon monoxide detector (not-included) is highly recommended.

This safety information printed on the cover of the Coal-trol Digital Power Module.

WARNING: BYPASS OF POWER VENT AND/OR BONNET LIMIT MAY NOT BE CORRECT FOR THIS INSTALLATION. OPERATION WITH IMPROPER BYPASS CONFIGURATION MAY CAUSE SERIOUS INJURY OR EVEN DEATH, DUE TO CARBON MONOXIDE POISONING OR FIRE. REFER TO INSTALLATION INSTRUCTIONS TO DETERMINE PROPER CONFIGURATION.

HIGH VOLTAGE -
DISCONNECT POWER
SUPPLY BEFORE SERVICING.

TO REDUCE RISK OF ELECTRICAL
SHOCK, DO NOT CONNECT TO A CIRCUIT
OPERATING AT MORE THAN 150 VOLTS
TO GROUND

TO REDUCE RISK OF ELECTRICAL SHOCK, THIS PRODUCT HAS A GROUNDING TYPE PLUG THAT HAS A GROUNDING PIN. THIS PLUG WILL ONLY FIT INTO A GROUNDING STYLE OUTLET. IF THE PLUG DOES NOT FIT INTO THE OUTLET, CONTACT A QUALIFIED ELECTRICIAN TO INSTALL THE PROPER OUTLET. DO NOT CHANGE THE PLUG IN ANY WAY.

Tools Required

Flat Screwdriver (thin blade), Philips screwdriver, Electric Drill with 3/16" Drill Bit and 5/16" Hex Driver bit.

Additional Material That May be Required

When installing the Coal-trol Digital onto stoves with existing controls, hand tools to remove junction boxes, timer boxes and relay boxes may be needed. Additionally, two and three prong 120V plug cords (3ft.), wire nuts, and electrical tape may be needed to adapt the stove motors to the Coal-trol Digital Power module. Please consider using a qualified Electrician or Heating Technician.

Installation Overview

Stoker-fed coal stoves (stoves) share common elements (motors) to feed coal, provide combustion air, distribute heat into the room and remove combustion products through the chimney. Installation of the Coal-trol Digital consists of identifying each of these elements for your particular stove, removing wiring to isolate the elements, wiring the motors with plug cords if necessary, and identifying and adapting two important safety controls if applicable.

Important Information Concerning Feeder Types

The Coal-trol Digital is compatible with two different feeder types:

- 1) Single-Motor and Tri Burner Type – This popular feeder type is found on many brands of stoves. It has one motor that drives a crank arm connected to the stoker and also drives a blower to supply combustion air to the stove.
- 2) Two-Motor Type – The Two-Motor feeder type has a separate motor for fuel feed (stoker) and the Combustion Blower.

The method of operation of the feeder by the Coal-trol Digital Thermostat is done at initial setup of the Thermostat. The first method (TBRN = 'Y' on the SETUP menu) controls a Single-Motor feeder by varying the speed of the feeder motor as needed to maintain temperature setting.

The second method (TBRN = 'N' on the SETUP menu), controls feeder by running the Stoker motor at full speed for short periods of time needed to maintain the temperature setting. The Combustion Blower is plugged into the Power Module and runs continuously to supply air for combustion.

Mounting the Thermostat

The room temperature sensor is located in the Thermostat. For proper operation, the sensor must be exposed to the heat produced by the stove. The preferred mounting locations include: on an inside wall, away from the direct air stream of the convection blower, and away from radiant heat produced by stove. Note that the Thermostat does not have to be within the same room as the stove. For example, a coal furnace ducted to the return air plenum of an oil or gas will give good results if the Thermostat is mounted next to the oil/gas furnace thermostat.



Mounting Screws
#6 x 3/4" Philips



Thermostat Bracket
(Unclip the bracket from the thermostat for mounting.)

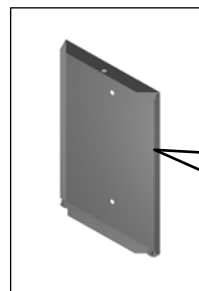


Mounting the Power Module

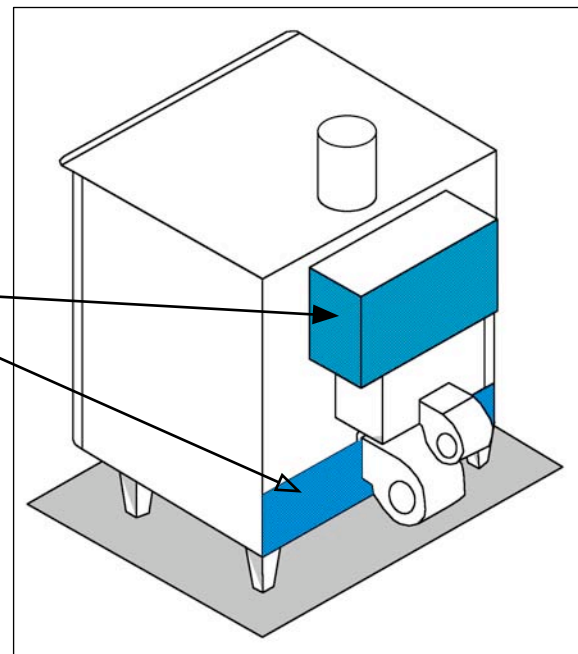
Mount Bracket onto Fuel Hopper or on rear wall below stoker



Mounting Screws
#10 x 3/4" Hex



Power Module
Bracket



Stove – Rear View

Power Module Mounting Instructions:

- 1) Remove screw from Power Module that secures the Mounting Bracket.
- 2) Locate and fasten Mounting Bracket to stove with the two supplied screws.
- 3) Mount Power Module to bracket and secure with screw removed in step 1.

Some Power Module Mounting Alternatives



Attaching Power Module to Bracket on side of coal hopper.



When mounting on bottom of coal hopper, use silicone sealant on bracket mounting screws.



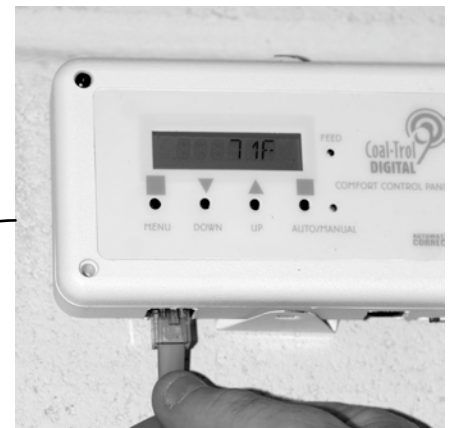
When mounting on rear wall, only mount on cool surface below 80 . If surface is too hot to touch, do not mount Power Module on it!

Connect Thermostat to Power Module

25 ft. Thermostat Cord



Plug Cable into RJ45 Jack on Power Module



Plug cable into RJ45 jack on left side of Thermostat.

The provided 25ft. cord may be extended with an 8 pin, RJ45 to RJ45 coupler and/or standard computer network cable. The cable must be a 'through' type, not a crossover type. Note: The Coal-trol thermostat and Power Module cannot be connected to computer networks through this cable.

Power Module Layout

POWER VENT BYPASS

BONNET LIMIT BYPASS

FUSE
MAX 10A/125V FAST

ON/OFF

POWER CORD

WARNING: BYPASS OF POWER VENT AND/OR BONNET LIMIT MAY NOT BE CORRECT FOR THIS INSTALLATION. OPERATION WITH IMPROPER BYPASS CONFIGURATION MAY CAUSE SERIOUS INJURY OR EVEN DEATH, DUE TO CARBON MONOXIDE POISONING OR FIRE. REFER TO INSTALLATION INSTRUCTIONS TO DETERMINE PROPER CONFIGURATION.

AC POWER

SPARE OUTPUT


COMBUSTION AIR

THERMOSTAT CONNECTOR

IGNITER

CONVECTION BLOWER


STOKER



POWER MODULE PB1

TO REDUCE RISK OF ELECTRICAL SHOCK, THIS PRODUCT HAS A GROUNDING TYPE PLUG THAT HAS A GROUNDING PIN. THIS PLUG WILL ONLY FIT INTO A GROUNDING STYLE OUTLET. IF THE PLUG DOES NOT FIT INTO THE OUTLET, CONTACT A QUALIFIED ELECTRICIAN TO INSTALL THE PROPER OUTLET. DO NOT CHANGE THE PLUG IN ANY WAY.

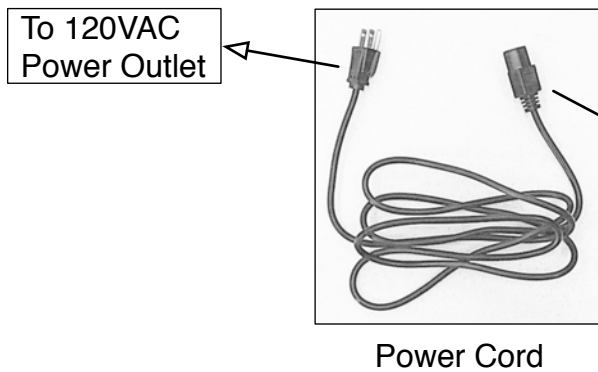
VOLTS: 125 FREQ: 60 Hz AMPS: 10 WATTS: 1200
 MAX AMBIENT: 104 DegF/ 40 DegC
 FOR INDOOR USE ONLY
 CONFORMS TO UL 873



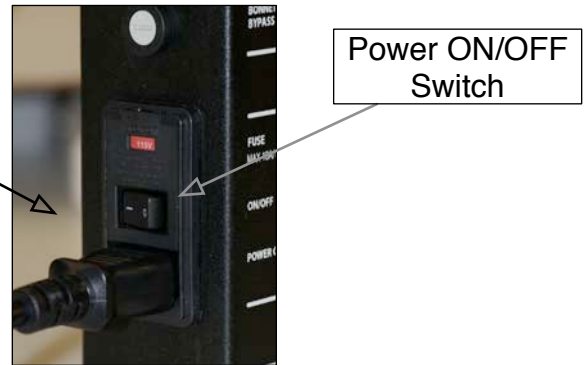
AUTOMATION CORRECT LLC
 SYRACUSE • NY
 MADE IN USA

POWER VENT LIMIT	BONNET LIMIT	POWER VENT BLOWER 4A MAX	COMBUSTION BLOWER 1.5A MAX	IGNITER 3A MAX	CONVECTION BLOWER 2A MAX	STOKER 1.5A MAX
------------------	--------------	--------------------------	----------------------------	----------------	--------------------------	-----------------

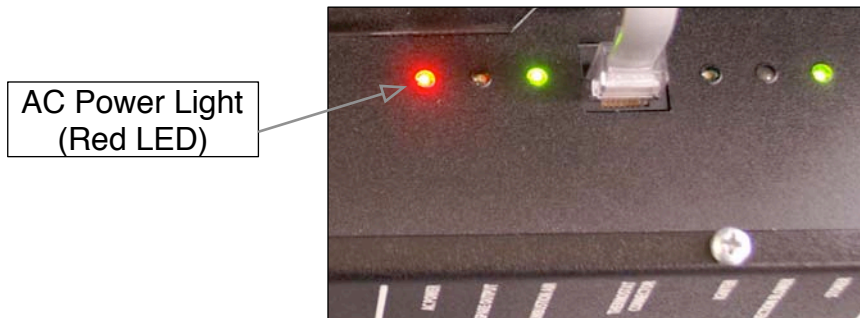
Attaching Power Cord



Power On/Off Switch



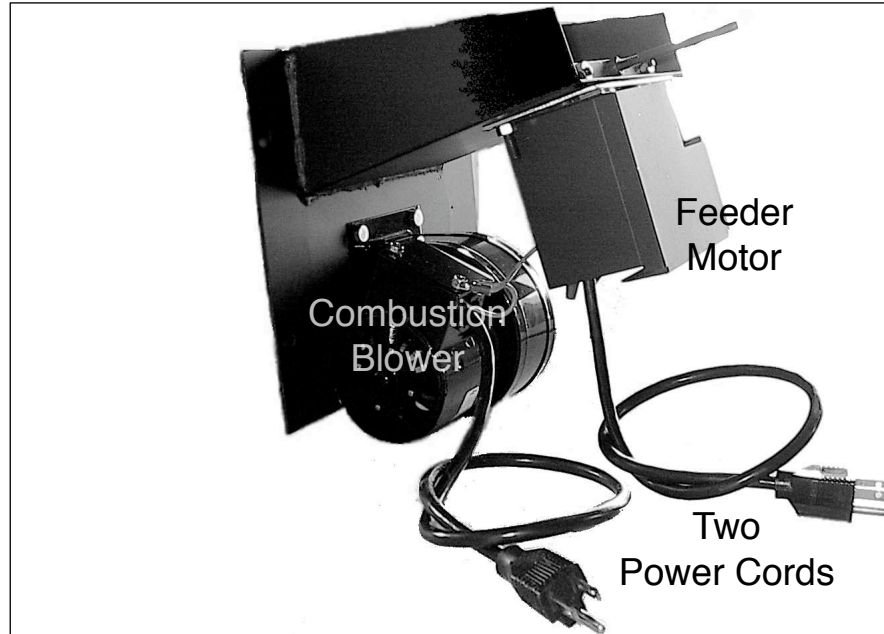
Power ON/OFF Indication



Identifying and Adapting your Feeder Type

Two-Motor Feeder Type

A Two-Motor feeder is identified by observing that a separate motor for fuel stoker and for combustion air exists.



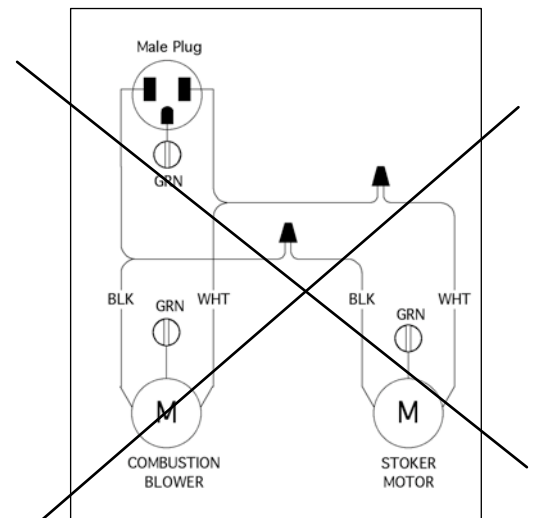
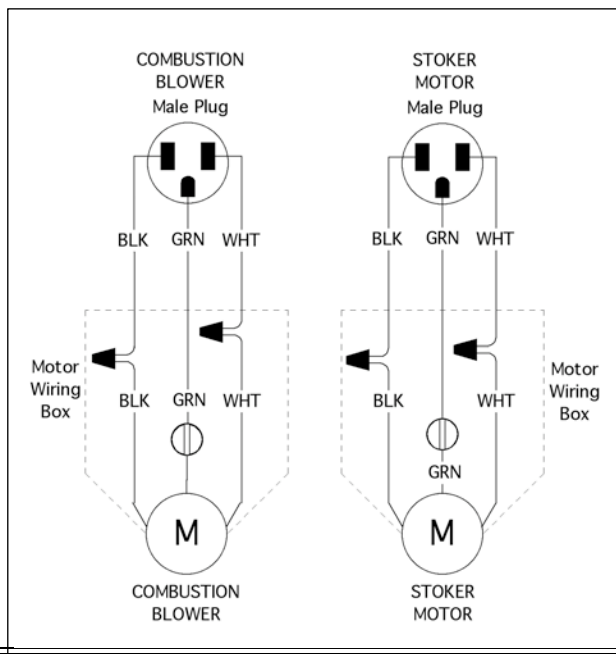
Courtesy of Leisure Line Stove Company

Wiring a Two-Motor Feeder

If the feeder does not already have 3-wire male power cords, they must be attached as shown below.

Desired Two-Motor feeder arrangement for Coal-trol Digital. Wiring diagram of figure above.

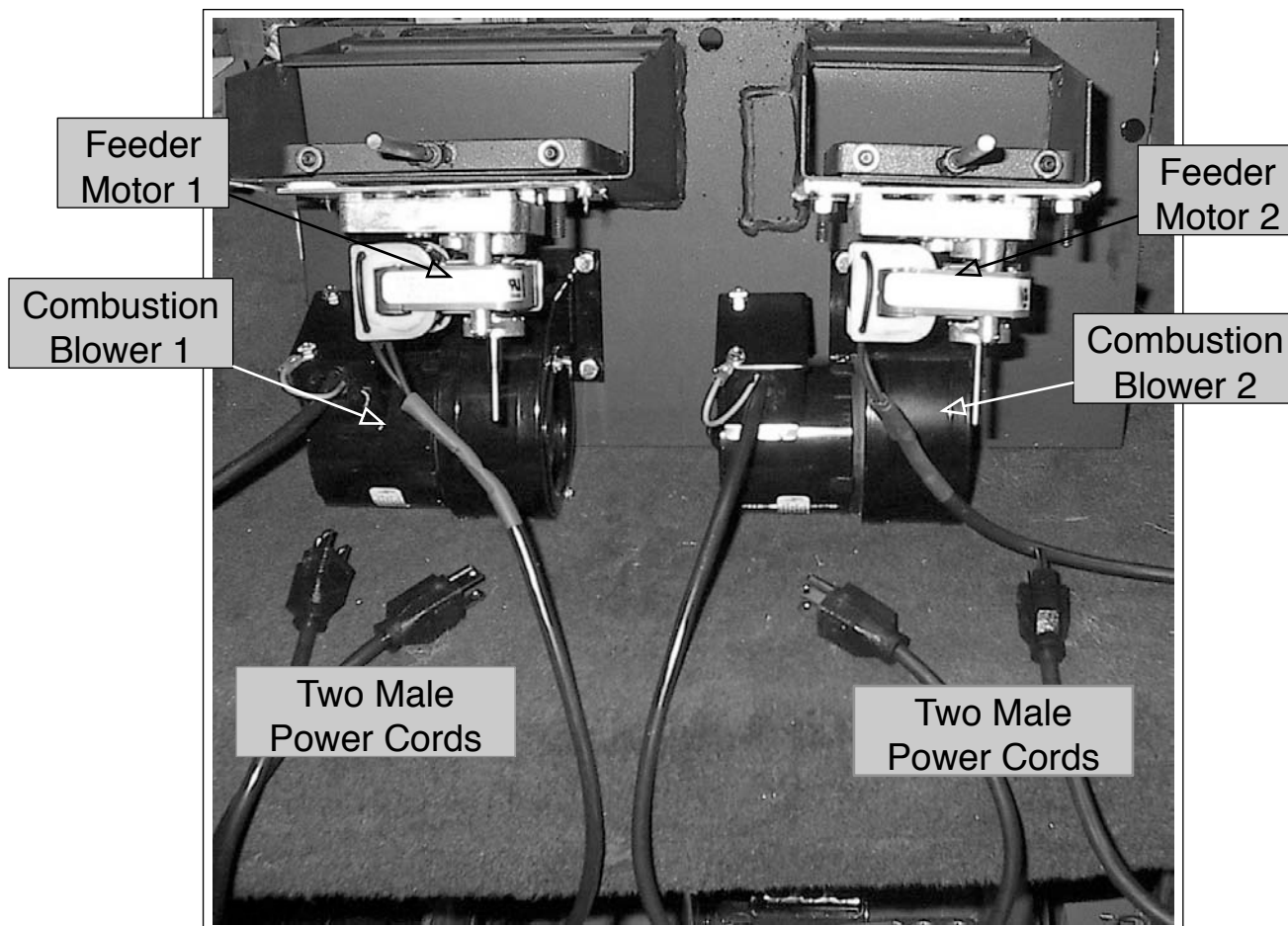
On some stoves, you may find a Two-motor feeder that has been wired so that it operates as a Single-Motor feeder. You will need to convert this arrangement to the two-plug wiring shown in the diagram on the left.



Identifying and Adapting your Feeder Type

Dual-Burner Type

Dual Burner Type Feeder



Courtesy of Leisure Line Stove Company

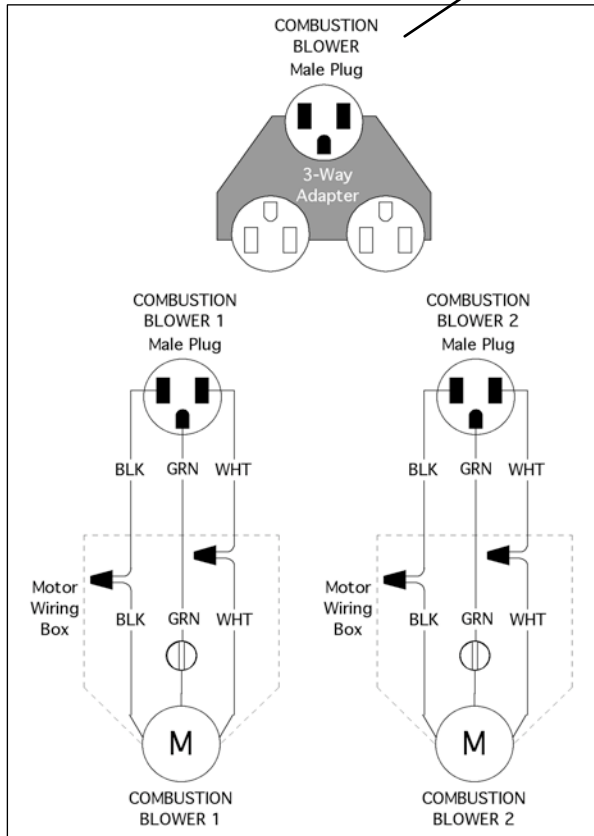
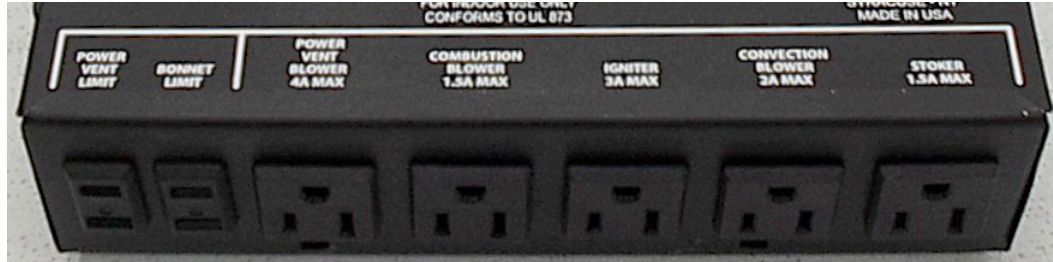
The Dual-Burner type feeder can be adapted to the Coal-trol Digital by plugging both feeders together into the Power Module Stoker receptacle and both Combustion Blowers into the Power Module Combustion Blower receptacle.

Optionally, an On/Off switch may be placed into the secondary feeder to allow it to be turned off when not in use.

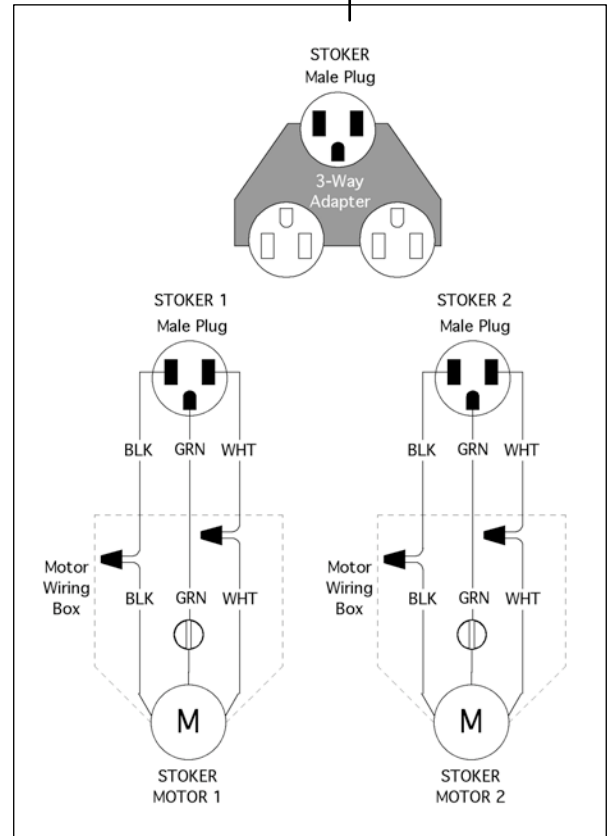
Wiring a Dual-Burner Feeder Type

Dual-Burner Type Wiring Diagram

Power Module



Use of a 3-Way Adapter to adapt Two Stoker motors to single outlet on Power Module.

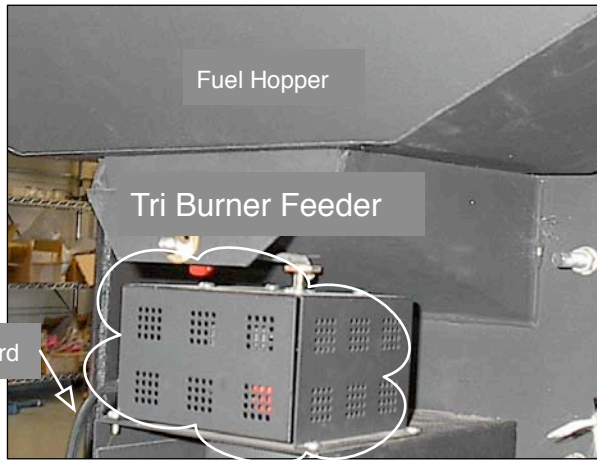


Use of a 3-Way Adapter to adapt Two Combustion Blowers to single outlet on Power Module.

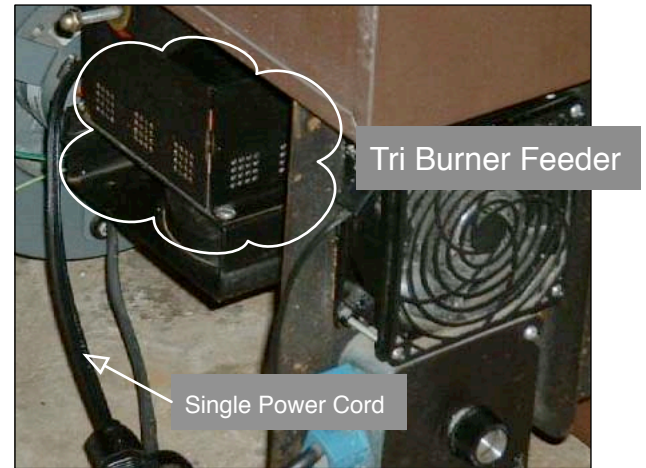
Identifying and Adapting your Feeder Type

Single-Motor Tri Burner Type

View From Back of Stove to Identify a Tri-burner Type Feeder



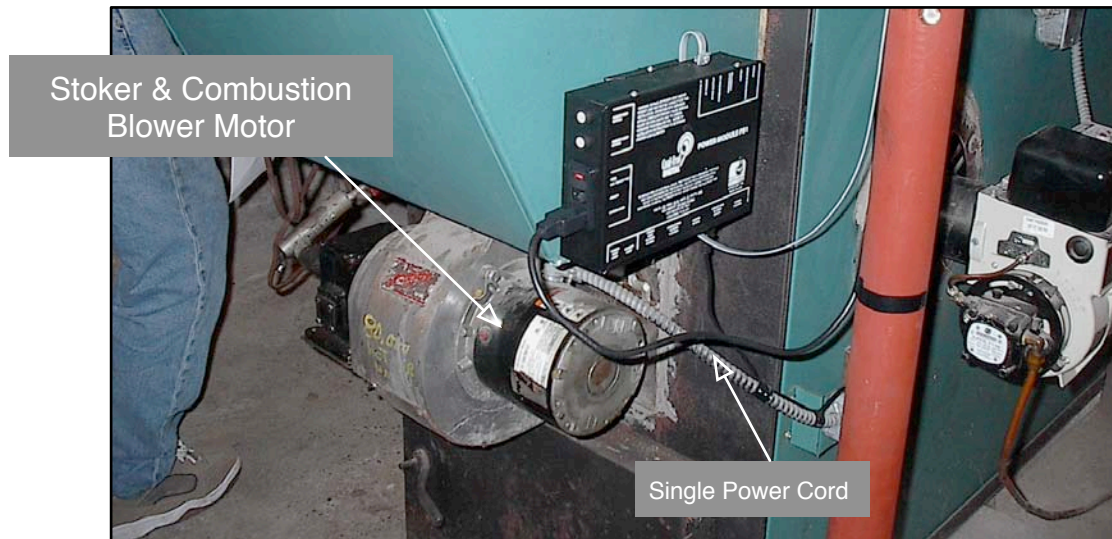
Example 1 : Reading Brand Stove with Tri-burner Feeder
(Courtesy Reading Stove Co.)



Example 2: Older Alaska Brand Stove
with Tri-burner Feeder

The Tri-burner feeder mechanism is found on Tri-burner and Reading Stoves. Older brand Alaska and Leisure Line are also known to have this mechanism. The key indicator of a Tri-burner feeder is that there is only one motor controlling both combustion air supply and coal feed.

Other Single-Motor Feeder Types

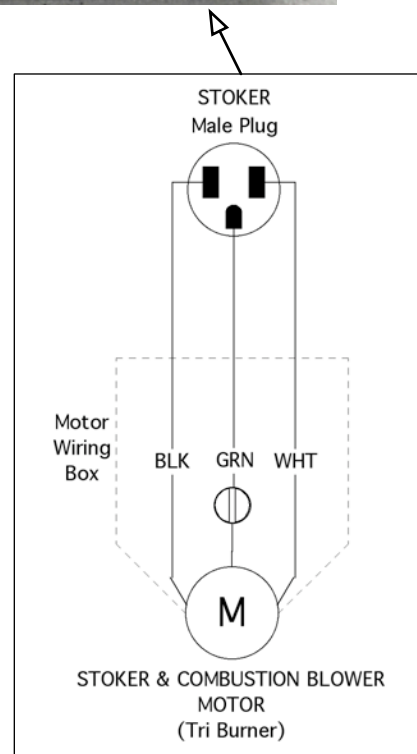
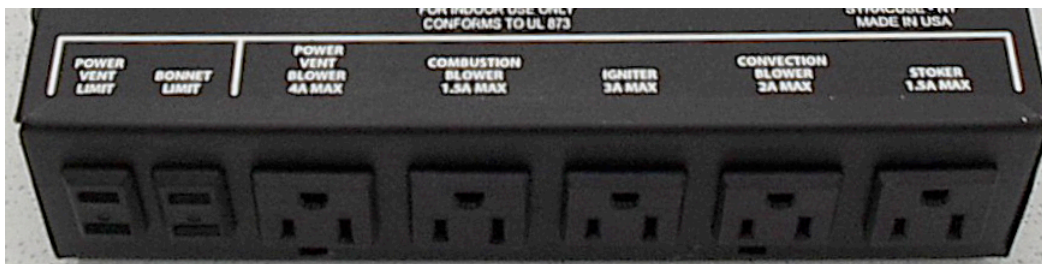


Single-Motor Feeder on Keystoker A80 Coal/Oil Furnace.

Please contact contact Automation Correct before you apply the Coal-trol Digital to this type of furnace feeder.

Wiring a Single-Motor Feeder (Tri Burner)

Power Module



Power Assisted Flue Vent

Power Vent/Direct Vent

Power assisted chimney vents (Power Vent/Direct Vent) consist of a blower, a limit switch (Fume Switch), and in some systems a rheostat to adjust the blower speed control. The power assisted vent provides forced chimney draft, eliminating the need for a conventional natural draft chimney. Because a fan motor provides the draft, a safety limit is required to ensure that the power assisted vent is actually exhausting the stove. If the blower fails or the vent pipe is blocked, heat from the stove will reach the Fume switch and shutdown the stove.

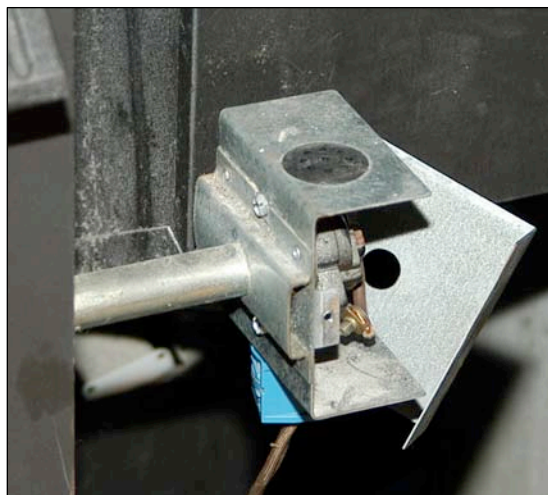
CAUTION – Adaptation of a power assisted vent to the Coal-trol Digital must utilize the Fume switch interlock. Do not install the Power Vent Limit Bypass fuse when using a power assisted vent system.



Power assist vent from Leisure Line Stove Company



Power assisted vent on Alaska brand stove.



Fume Switch with cover partly removed.

Power Assisted Flue Vent

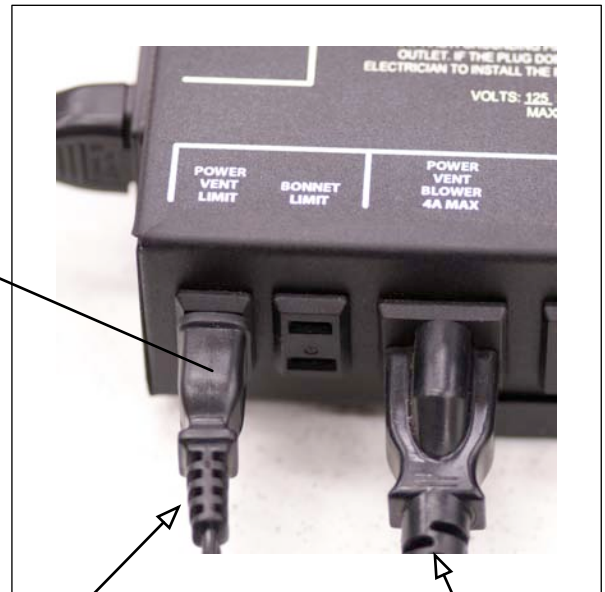
Power Vent/Direct Vent

Power assisted chimney vents (Power Vent/Direct Vent) consist of a blower, a limit switch (Fume Switch), and in some systems a rheostat to adjust the blower speed control. The power assisted vent provides forced chimney draft, eliminating the need for a natural draft chimney. Because a fan motor provides the draft, a safety limit(Fume Switch) is required to ensure that the power assisted vent is actually exhausting the stove. If the blower fails or the vent pipe is blocked, heat from the stove will reach the Fume switch and shutdown the stove.

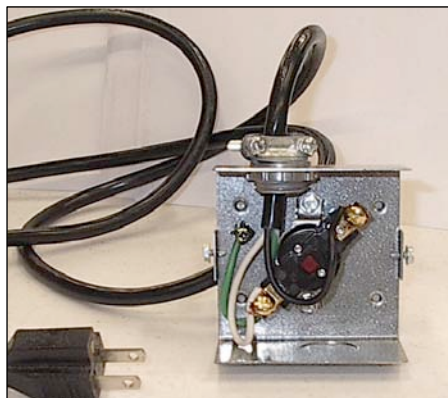
The two-prong Power Vent Limit outlet, located in the lower left hand corner of the Power Module, is for wiring of a normally closed Fume switch to the Power Module. When the limit switch opens, power is removed from all outputs except for the Power Vent outlet.

Power Vent and Fume Switch Wiring

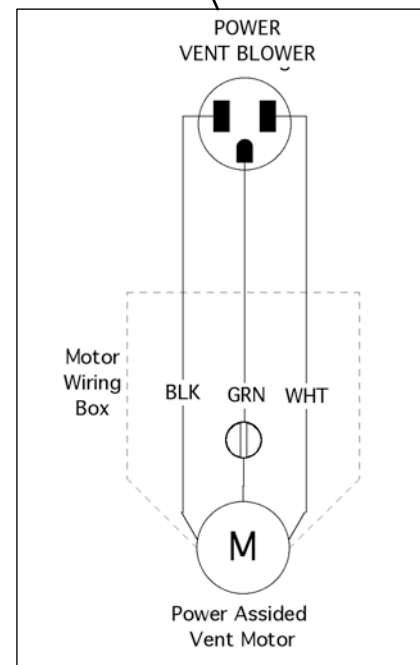
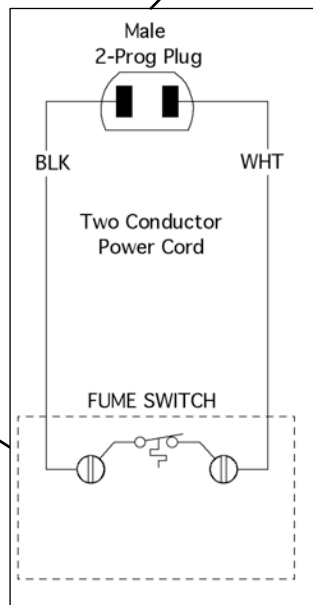
CAUTION: DO NOT PLUG 2-PRONG FUME SWITCH PLUG INTO 3-PRONG RECEPTACLES OR 120V OUTLET.



Fume Switch Wiring



WARNING: Never relocate the fume switch from its factory provided mounting location.



Power Vent Bypass

The Power Vent Bypass is a fuse holder located in the upper left hand corner of the Power Module.

For installations with a Fume switch, a nonconducting slug should be installed into the Bonnet Limit Bypass fuseholder.

For natural chimney installation, a 10A fuse must be installed in the Power Vent Bypass fuseholder.

Power Assisted Chimney with Fume Switch Installations (Power Vent/Direct Vent)



Installing Power Vent Bypass nonconducting slug.
(Initially installed at the factory.)

WARNING: Never install a fuse into Power Vent Bypass fuseholder when stove installation has a Power Assisted Chimney.

Natural Draft Chimney Installations



Installing Power Vent Bypass fuse.
(10A Slo-Blow)

Bonnet Limit (Bonnet High Temperature Limit Switch)

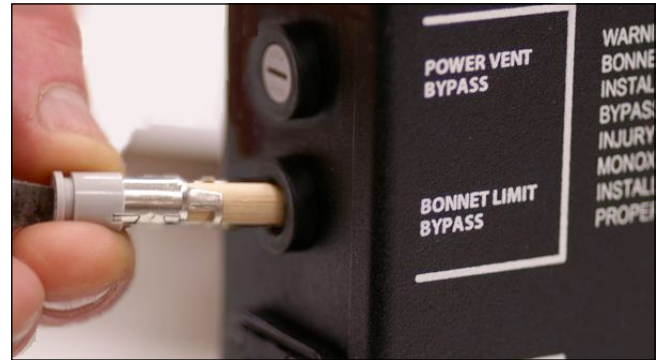
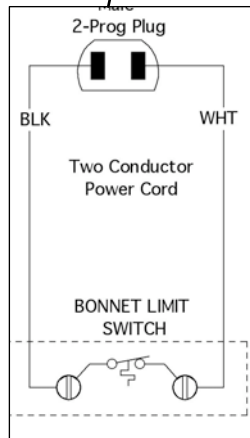
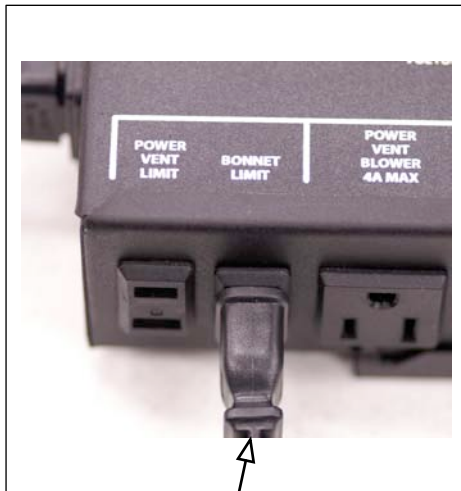
The two-prong Bonnet Limit outlet, located in the lower left hand corner of the Power Module, is for wiring of a normally closed temperature limit switch to the Power Module. When the limit switch opens, power is removed from all outputs except for the Power Vent outlet.

If the installation does not use a Bonnet Limit switch, a 10A fuse must be installed in the Bonnet Limit Bypass fuseholder located in the upper left hand side of the Power Module.

If a Bonnet Limit switch has been connected to the Bonnet Limit receptacle, a nonconducting slug should be installed into the Bonnet Limit Bypass fuseholder.

Instruction for Bonnet Limit (Bonnet High Temperature Limit)

Bonnet Limit Switch



Installing Bonnet Limit Bypass nonconducting slug. (Initially installed at the factory.)

WARNING: Never install a fuse into Bonnet Limit Bypass fuseholder when stove installation requires a Bonnet High Temperature Limit.

Instruction for Bonnet Limit Bypass



Installing Bonnet Limit Bypass fuse. (10A Slo-Blow)

Coal-trol Digital TEST on Initial Power-up

DISPLAY

TEST

Auto/Manual
light blinking

INIT

5 1200P

ACTION

Each motor is momentarily turned on for 1 second. After 1 minute TEST finishes.

Thermostat is starting up.
Thermostat automatically goes to Time of Day Setting display.

Set the Time of Day with the UP/DOWN buttons. Press MENU button when complete.

NOTE

To initiate TEST, turn control module power off for 5 minutes. Cancel TEST mode by pressing the MENU button.

Red MANUAL light is on. Feeder Mode is in MANUAL Feeder Control on completion of TEST mode.

SETUP of the Coal-trol Digital Thermostat for a Particular Stove Type

The last step before stove operation is to tell the thermostat the minimum and the maximum feeder rates, and to set the type of feeder, either Tri Burner type, or not. These settings are accomplished through the SETUP menu on the thermostat. Once set, these settings are retained after power loss and need not be adjusted unless necessary.

These "One-time" settings allow the Coal-trol System to be adapted to many fuel feeder types and brands of stoves. Automation Correct LLC has compiled settings for a number of stoves, however with a simple procedure, other stove types may be "tuned" in.

SETUP MENU – "One-time" Setting descriptions

DEG – For selection of Fahrenheit or Celsius temperature units.

TBRN – This selects the method of feeder control. When selected (TBRN = Y), the feeder runs continuously with its speed varied up and down to adjust firing rates. Additionally, at feeder rates below approximately 50%, short feeder pauses (feeder starts and stops) occur. When not selected (TBRN=N), the feeder when commanded runs at full speed, it starts and stops in a proportional manner to adjust firing rate.

MIN – Minimum feeder rate. (%)

This setting sets the minimum feed rate to maintain low fire. When the thermostat output equals 0 (zero) as indicated on the MAN or AUT display, the MIN setting allows the stove to maintain a small fire. The object is to set MIN so that about a 1/4 to 1/2" of fire is maintained when the stove MAN/AUT output = 0 (zero).

MAX – Maximum feeder rate. (%)

This setting sets the maximum feed to limit the stove high fire rate. When the thermostat output equals 99 as indicated on the MAN/AUT display, the MAX is set so that a full grate of fire is maintained without over-feeding. The object is to set MAX so that no unburned or burning coal over-stokes the stove.

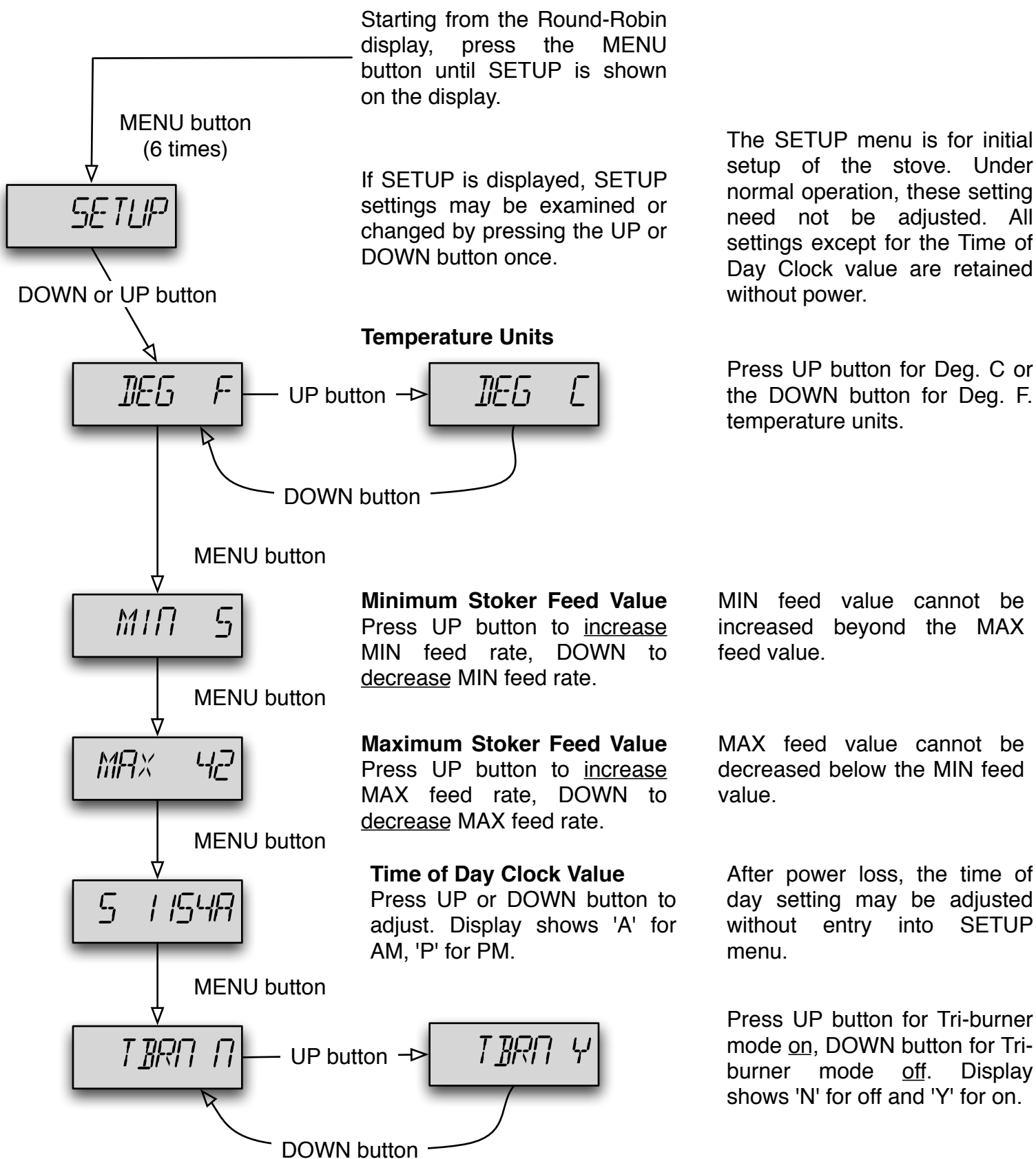
The operation of the SETUP menu is described on the following page. After this, two procedures are described, one for Single-Motor feeder types (Tri Burner), and one for Two-Motor feeder types.

SETUP Menu Operation

DISPLAY

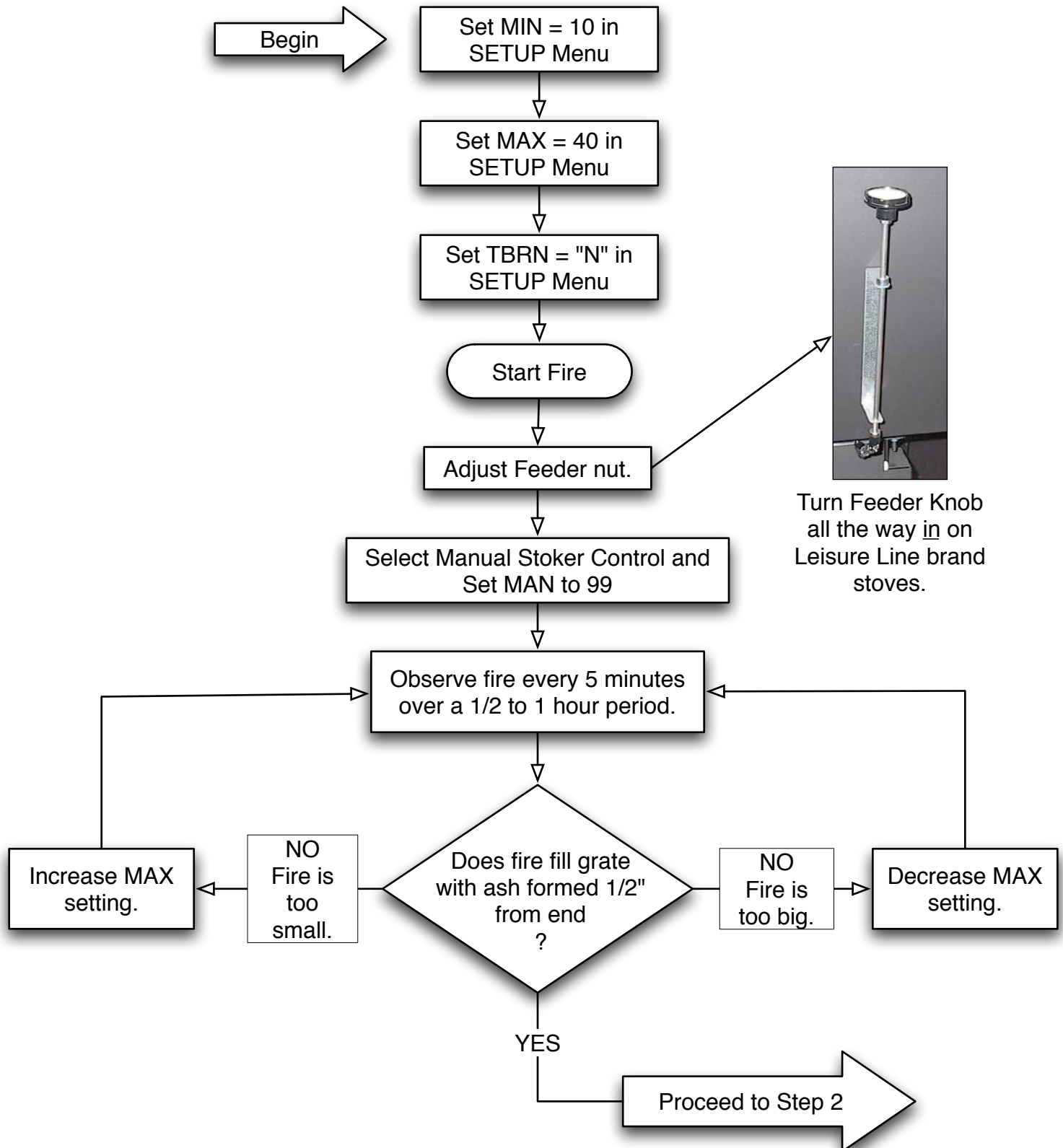
ACTION

NOTE



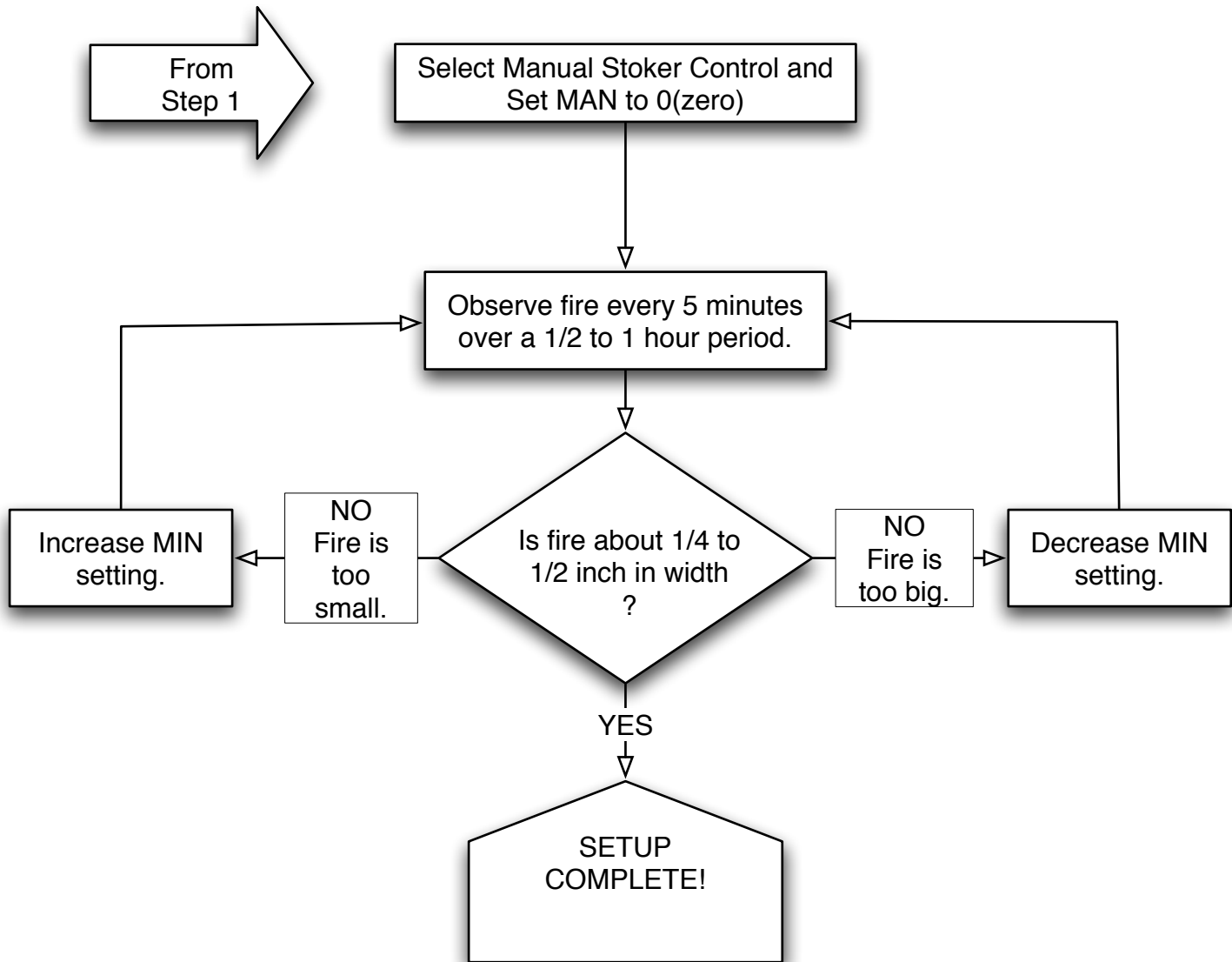
SETUP of the Coal-trol Digital Thermostat for Two-Motor Feeder Type

Step 1- Set Feeder Type and Maximum Feed Rate



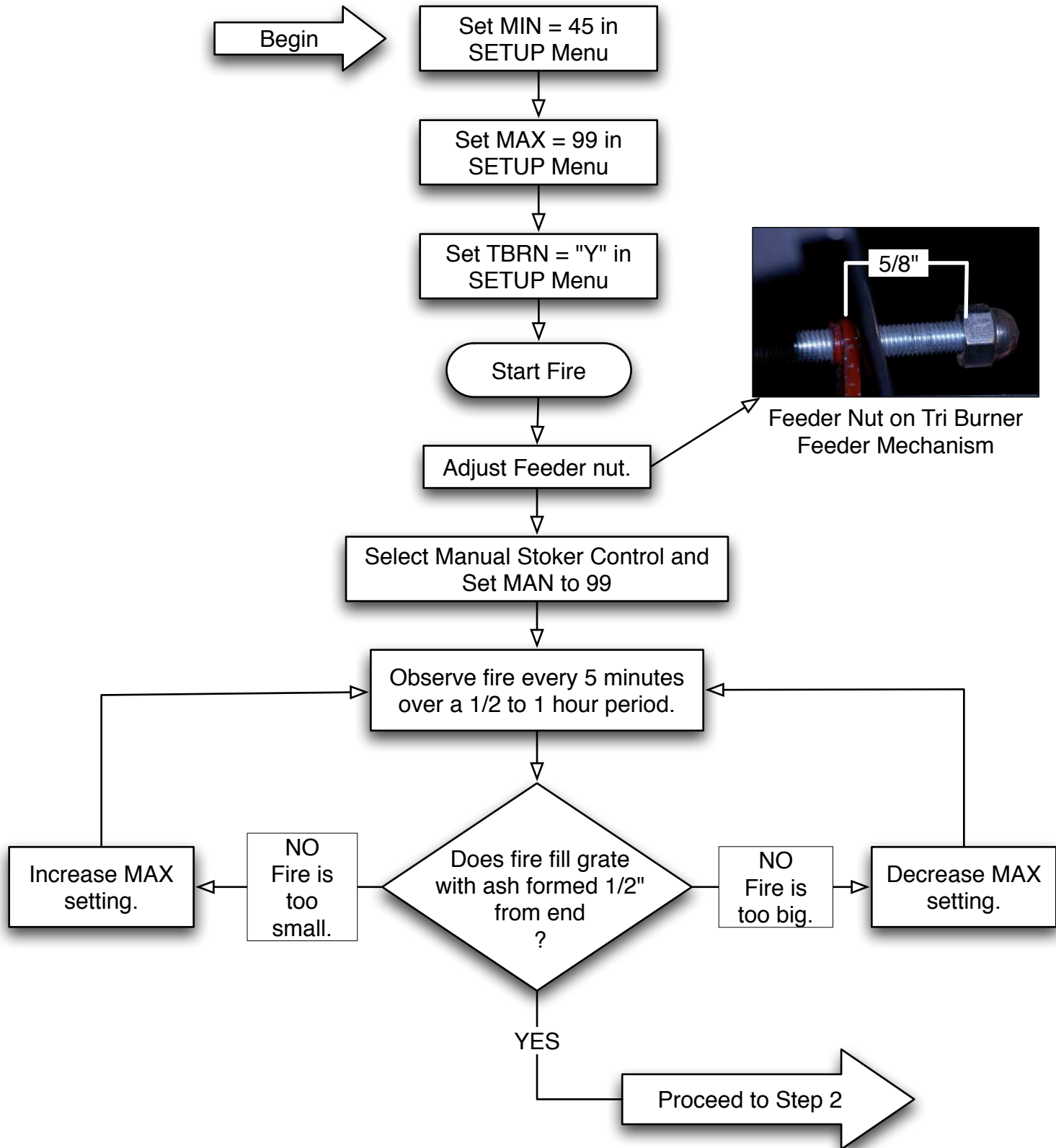
SETUP of the Coal-trol Digital Thermostat for Two-Motor Feeder Type

Step 2- Set Minimum Feed Rate



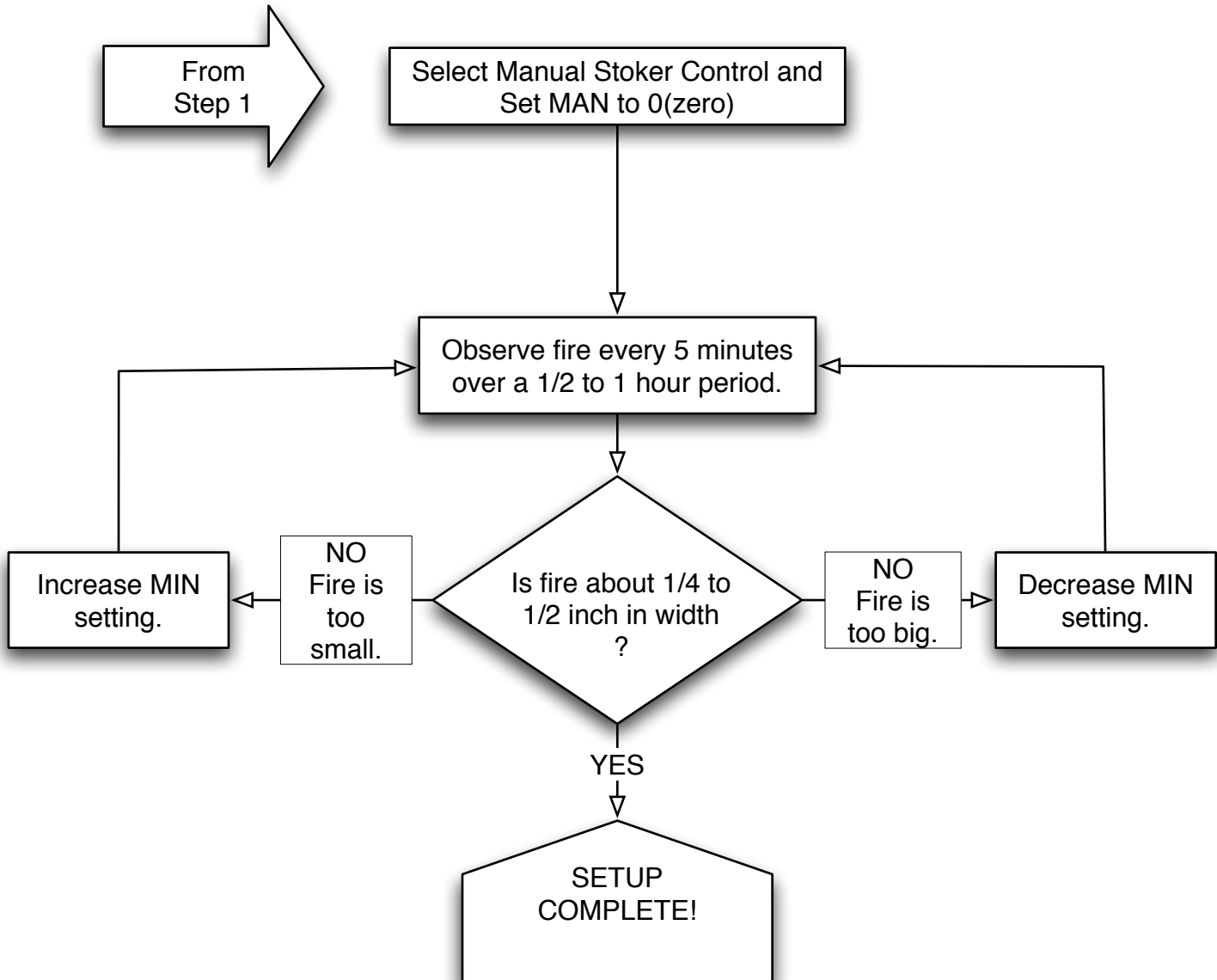
SETUP of the Coal-trol Digital Thermostat for
Single-Motor Feeder Type (Tri Burner)

Step 1- Set Feeder Type and Maximum Feed Rate



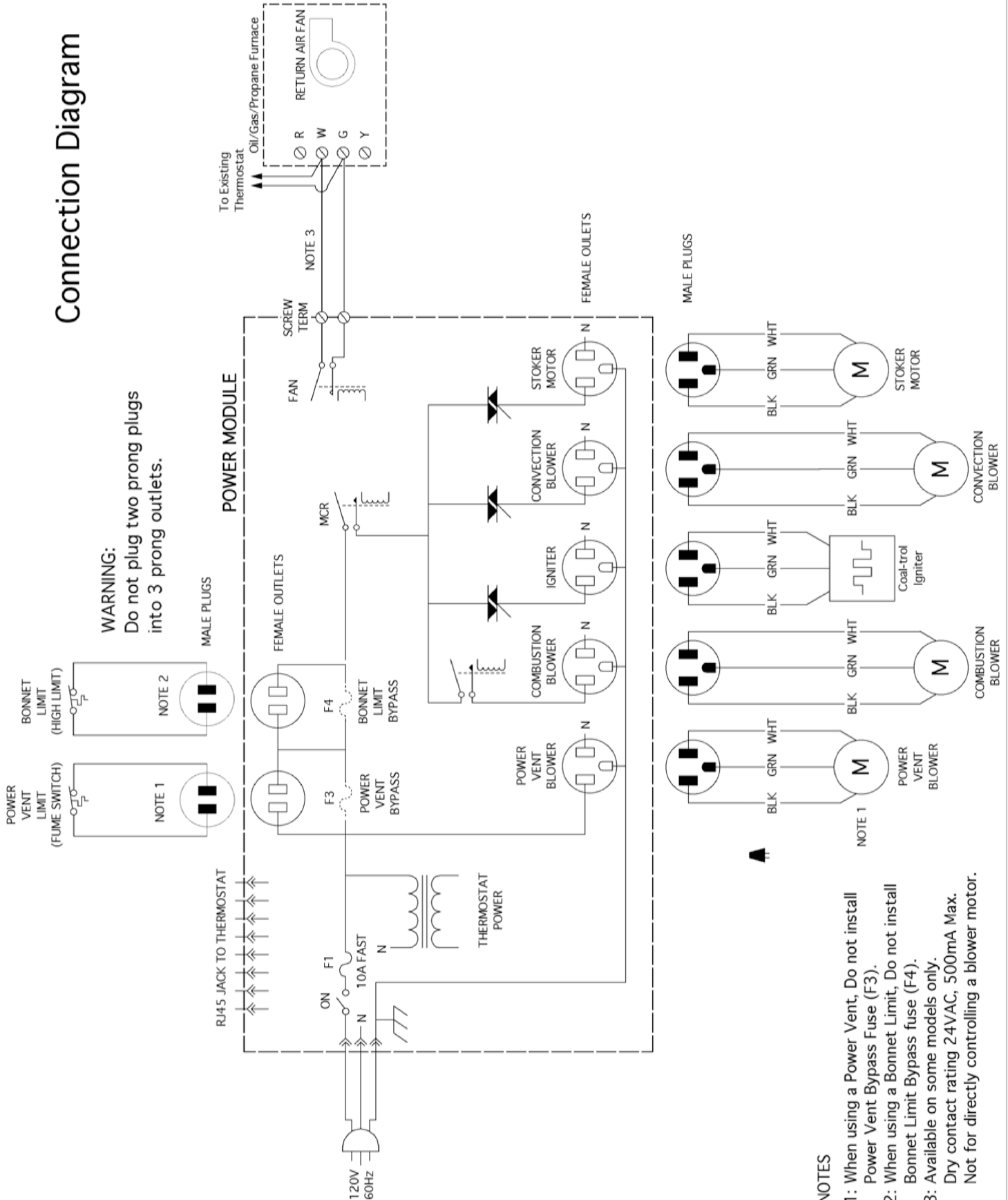
SETUP of the Coal-trol Digital Thermostat for Single-Motor Feeder Type (Tri Burner)

Step 2- Set Minimum Feed Rate



Power Module - Connection Diagram

Connection Diagram



WARNING:
Do not plug two prong plugs into 3 prong outlets.

NOTES

- 1: When using a Power Vent, Do not install Power Vent Bypass Fuse (F3).
 - 2: When using a Bonnet Limit, Do not install Bonnet Limit Bypass fuse (F4).
 - 3: Available on some models only.
- Dry contact rating 24VAC, 500mA Max.
Not for directly controlling a blower motor.



**AUTOMATION
CORRECT LLC**
Syracuse • NY

www.automationcorrect.com

Automation Correct LLC designs and manufactures technology products for home and industry. Combining over 75 years of practical experience, the Engineers and Technicians of Automation Correct LLC are dedicated to supporting our customers with innovative products.

Copyright 2004, 2005 Automation Correct LLC. All rights reserved.
Coal-trol Digital™, Pelli-stat™ by Automation Correct LLC
All others trademarks by the respective owners.